

White Powder Gold

A Miracle of Modern Alchemy

*This elusive group
of substances
defies orthodox
science and
medicine.*

*Is this a miracle-
in-the-making for
the next
millennium?*

Part 1

A Lecture by David Hudson

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Science of the Spirit Foundation
PO Box 25709
Tempe, AZ 85285, USA

My name is David Hudson. I'm a third generation native Phoenician from an old family in the Phoenix area. We are very conservative. I had no concept that I would ever be doing what I'm doing right now when I began this work. In 1975-76 I was very unhappy with the banking system here in the United States. I was farming about 70,000 acres in the Phoenix area in the Yuma Valley. I was a very large, materialistic person. I was farming this amount of ground. I had a 40-man payroll every week. I had a four-million-dollar line of credit with the bank. I was driving Mercedes Benzes. I had a 15,000-square-foot home. I was Mr Material man.

In 1975 I was doing an analysis of natural products here in the area where I was farming. You have to understand that in agriculture in the state of Arizona we have a problem with sodium soil. This high-sodium soil, which looks like chocolate ice-cream on the ground, is just crunchy black. It crunches when you walk on it. Water will not penetrate this soil. Water will not leach the sodium out of the ground. It's called black alkali.

What we were doing was going to the copper mines in the state of Arizona and buying 93 per cent sulphuric acid. For those of you who don't know, the battery acid in your car is 40 to 60 per cent acid. This was 93 per cent sulphuric acid; very, very high concentration. We were bringing in truck- and trailer-loads of this sulphuric acid to my farm and I was injecting 30 tons to the acre into the soil.

We were putting six-inch ribbons on the ground that would penetrate about three or four inches into the ground. When you irrigate—nothing will grow in Arizona unless you irrigate—the ground would actually froth and foam due to the action of the sulphuric acid. What it did was convert the black alkali to white alkali, which was water-soluble. So, within a year-and-a-half to two years, you would have a field that could actually grow crops.

In the work that I was doing with these soils, it was very important to have a lot of calcium in the soil in the form of calcium carbonate. The calcium carbonate would act as a buffer for all the acid that was being put on the soil. If you don't have enough calcium, the acidity of the soil goes down, you get a pH of 4 to 4.5 and it ties up all of your trace nutrients. When you plant your cotton, it will only get so tall; then it won't grow any more. It's very important when you are putting all of these amendments on your soil that you understand what is in your soil: how much iron is there, how much calcium is there, and so on.

In doing the analysis of these natural products, we were coming across this material but no one was able to tell us what it was. We began to trace this material and we found that it seemed to come from a specific geological feature. Whatever the problem was with this material, we felt that the area where it was in greatest abundance would be the best place to study it.

We took the material into Chemistry and we dissolved it and got a solution that would be blood-red. Yet when we precipitated this material out chemically by using a reductant of powdered zinc, the material would come out as a black precipitant just like it was supposed to be if it were a noble element. With a noble element, if you chemically bring it out of the acid, it won't redissolve in the acid.

So we precipitated this material out of the black and we took the material and dried it. In the drying process we took a large porcelain funnel called a Büchner funnel which had a filter paper on it. This material was about a quarter of an inch thick on top of the filter paper. At that time I didn't have a drying furnace or a drying oven, so I just set it out in

the Arizona sunshine which was about 115 degrees at five per cent humidity, so it really dried fast.

What happened was that after the material dried, it 'exploded'. It exploded like no explosion I had ever seen in my life, and I've worked with a lot of explosive materials. There was no explosion and there was no implosion. It was as if somebody had detonated about 50,000 flash bulbs all at one time—just poof! All the material was gone, the filter paper was gone and the funnel was cracked.

So I took a brand new pencil that had never been sharpened, stood it on end next to the funnel and started drying another sample. When the material detonated, it burned the pencil about 30 per cent in two but did not knock the pencil over. All the sample was gone. So this was not an explosion and was not an implosion. It was like a tremendous release of light. It was like you set that pencil beside a fireplace and after about 20 minutes you saw it was smoking on one side and burning in two. That's what the pencil looked like immediately after the flash. Now this just had me baffled. Whatever this stuff was, it was wild. We found that if we dried it out of the sunlight, it didn't explode; but if we dried it *in* the sunlight, it exploded.

Then we took some of the powder that was dried *out* of the sunlight, and we decided to put it in what is called a crucible reduction. A crucible reduction involves taking a crucible—which is like a big drinking-glass made out of porcelain—and mixing your powder with lead and all this flux, and heating it 'til the lead melts. What happens is the metals that are heavier than lead stay in the lead, and all of those that are lighter float out. This is the basic premise of your fire assays which have been done for hundreds of years. Now supposedly, gold and silver will stay in the lead and all your other non-heavy elements will come out of the lead. This is the tried-and-true way of doing metals analysis.

Well, this material settled to the bottom of the lead just like it was gold and silver. This material seemed to be denser than lead. When we poured off the slag it would take everything but the noble elements. When we poured off the lead, this material

would come off as a constituent at the bottom of the molten lead. It was separated from it. Yet when we take this material and put it on a bone ash cupel, the lead soaks into the cupel and it leaves this bead of gold and silver. Well, we did this and we got a bead that should have been gold and silver.

We took this bead for analysis to all the commercial laboratories and they said, "Dave, there is nothing but gold and silver there." Except I could take that bead, set it on a table, hit it with a hammer and shatter it like glass. Now there is no known alloy of gold and silver that is not soft. Gold and silver dissolve in each other perfectly and they form solid solutions. They are both very soft elements, and so any alloy of gold and silver, if that's all that's there, is going to be soft and ductile. You can flatten it out and make a pancake out of it. Yet this material shattered like glass. I said, "Something's going on here that we are not understanding. Something unusual is happening."

So what we did was we took these beads of gold and silver and separated them chemically, with the gold and silver out. What we had left was a whole bunch of black stuff. When I took this black stuff to the commercial laboratories they told me that it was iron, silica and aluminum. I said, "This can't be iron, silica and aluminum. First of all, you can't dissolve it in any acids or any bases once it is totally dry. It doesn't dissolve in fuming sulphuric acid, it doesn't dissolve in sulphuric nitric acid, it doesn't dissolve in hydrochloric nitric acid. Even this dissolves gold, yet it won't dissolve this black stuff." I thought this material was really strange. It just had to have an explanation. No one could tell me what it was.

Basically, I went to Cornell University. I said, "We are just going to have to throw some money at this problem." So I went and hired a Ph.D. at Cornell who considered himself an expert on precious elements. I suspected we were dealing with precious elements. I said, "I want to know what this is." I paid him to come out to Arizona. He looked at the problem. He said, "We have a machine back at Cornell that can analyse down to parts per billion. You let me take this material back to Cornell and I'll tell you exactly what you have, exactly. Unless it is chlorine, bromine or one of the lighter elements, then we can't analyse it. But if it is anything above iron, we will find it." When we got back there he told me it was iron, silica and aluminum.

I said, "Look, doctor, do you have a chemistry laboratory around here we could borrow?" He said, "Yes." I said, "Let's go to the chemistry laboratory." We worked in the chemistry laboratory all the rest of that day and we were able to remove all the silica, all the iron and all the aluminum. We still had 98 per cent of the sample, and that was pure nothing.

I said, "Look, I can hold this in my hand, I can weigh it, I can perform chemistries with it. That is something. I know that is something. It is not nothing." He said, "The absorption or emissions spectrum does not agree with anything we have programmed into our instrument." I said, "Well, that is something and I'm going to find out what."

And he said, "Mr Hudson, why don't you give us a US\$350,000-dollar grant and we'll put graduate students to looking into it." Well, I had already paid this man about US\$22,000 because he claimed he could analyse anything, and he hadn't. He didn't offer to pay any of my money back. I said, "Sir, I don't know what you pay the people around here, but we pay minimum wage on the farm where I work and I can get a lot more out of US\$350,000 than you can. So I'm going to go back and do the work myself."



I came back to Phoenix totally disillusioned with academia. I was not impressed with the Ph.D.s. I was not impressed with the people I had paid money to. I found out that it is just a big system where they work the graduate students to generate papers, but they never say anything. But the government pays them for every paper they write, so they get their money based on the number of papers they turn out. They all say the same thing: they just reword it and turn out another paper. It really is disillusioning when you find out what academia is doing right now.

Fortunately I asked around the Phoenix area and I found out about a man who was a spectroscopist. He had trained in West Germany at the Institute for Spectroscopy. He had been the senior technician for Lab Test company in Los Angeles which builds spectroscopic equipment. He's the man who blueprinted the machines, designed them, constructed them, then took them to the field and made them work. I said, "Here's a good man. This is not just a technician. Here is a man who knows how the machine works."

I went to him with a Soviet book that the fire assay man had given me. It was called *The Analytical Chemistry of the Platinum Group Elements*, by Ginzburg, *et al.* It was published by the Soviet Academy of Sciences. In this book, according to the Soviets, you had to do a 300-second burn on these elements to read them.

Now, for those of you who have never done spectroscopy, it involves taking a carbon electrode that is cupped at the top. You put the powder on that electrode, you bring the other electrode down above it and you strike an arc. In about 15 seconds, the carbon at this high temperature burns away; the electrode's gone and your sample's gone. So all the laboratories in this country are doing 15-second burns and giving you the results. According to the Soviet Academy of Sciences, the boiling temperature of water is to the boiling temperature of iron, just like the boiling temperature of iron is to the boiling temperature of these elements.

As you know from driving a car, as long as there is water in the motor of your car, the temperature of that car engine will never be hotter than the boiling temperature of water until all the water is gone. If you just heated the water on the stove in a pan, you know that pan never gets hotter than the boiling temperature of the water 'til all the water is gone. Once all the water is gone, the temperature skyrockets really fast.

As long as there is iron there, the temperature of the sample can never get hotter than the boiling temperature of the iron until all of the iron is gone, so you can then heat this stuff. Now, it is hard to fathom how something with as high a boiling temperature as iron could be just like water to these elements, but it is. So, literally, we had to design and build an excitation chamber where argon gas could be put around this electrode so that no oxygen or air could get into the carbon electrode, and we could burn it not for 15 seconds but for 300 seconds. According to the Soviet Academy of Sciences, this is the length of time we had to burn the sample.

We set up, we got the pK blenders, we got the standards, we modified the machine, we did all the analysis for results, we did all the spectral lines on this three-and-a-half-metre instrument. That's the spec for how big the prism is which opened up the line spectrum. For those of you who don't know, most universities have a 1.5-metre instrument. This was a three-and-a-half-metre

instrument—a huge machine. It took up the whole garage area. It was about 30 feet long and about eight or nine feet high.

Anyway, when we ran this material, during the first 15 seconds we got iron, silica, aluminum, little traces of calcium and sodium, maybe a little titanium now and then, and then it went quiet and nothing read. So, at the end of 15 seconds, we were getting nothing. Twenty seconds, 25 seconds, 30 seconds, 35 seconds, 40 seconds—still nothing. Forty five seconds, 50 seconds, 55 seconds, 60 seconds, 65 seconds—but, if you looked in through the coloured glass, sitting there on the carbon electrode was this little ball of white material. There was still something in there.

At 70 seconds, exactly when the Soviet Academy of Sciences said it would read, palladium began to read. And after the palladium, platinum began to read. And after the platinum, rhodium began to read. After rhodium, ruthenium began to read. After ruthenium, then iridium began to read, and after the iridium, osmium began to read.

Now, if you're like me, I didn't know what these elements were. I had heard of platinum, platinum jewellery, but what were these other elements? Well, there are six platinum group elements in the periodic table—not just platinum. They didn't find out about them at the same time, so they have been added one at a time.

They are all elements, just like iron, cobalt and nickel are three different elements. Ruthenium, rhodium and palladium are light platinum, and osmium, iridium and platinum are the heavy platinum.

Well, we came to find out that rhodium was selling for about US\$3,000 per ounce. Gold sells for about US\$400 an ounce. Iridium sells for about US\$800 an ounce, and ruthenium sells for US\$150 an ounce. Then you say, "Gee, these are important materials, aren't they?" They are important materials because the best-known deposit in

the world is now being mined in South Africa. In this deposit you have to go a half-mile into the ground and mine an 18-inch seam of this stuff. When you bring it out, it contains one-third of one ounce per ton of all the precious elements.

Our analysis, which we ran for two-and-a-half years, we checked over and over. We checked every spectral line, we checked every potential on interference, we checked every aspect of this. We created apples and apples, oranges and oranges, bananas and bananas. We wanted exact matches.

When we were finished, the man was able to do quantitative analysis, and he said, "Dave, you have 6 to 8 ounces per ton of palladium, 12 to 13 ounces per ton of platinum, 150 ounces per ton of osmium, 250 ounces per ton of ruthenium, 600 ounces per ton of iridium, and 800 ounces per ton of rhodium—or a total of about 2,400 ounces per ton, when the best-known deposit in the world is one-third of one ounce per ton.

As you can see, this work wasn't an indicator that these elements were there; these elements were there, and they were there in *beaucoup* amounts. They were saying, "Hey, stupid man, pay attention; we are trying to show you something." If they had been there in little amounts, I probably would have been content with this. But they were there in such huge amounts that I said, "Golly, how can they be there in these quantities and no one knew it?"

Now, you keep in mind, it wasn't one spectral analysis; it was two-and-a-half years of spectral analysis, running this material every day. And the man actually sent me away when they read

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because he couldn't believe it either. He worked on it another two months before he called me up and said, "Dave, you are right." That is how sceptical he was about it. He couldn't apologise to me. He is a German researcher with German pride, so he had his wife call and apologise to me.

He was so impressed that he went back to Germany to the Institute of Spectroscopy. He was actually written up in the spectroscopic journals as having proven the existence of these elements in natural materials in the southwestern United States. They're not journals that you would ever read, but I actually saw the journals and he was written up.

They had no idea where this stuff was coming from, how we were producing it, what concentrations we had gone through or anything. They had analysed just this small amount of powder. The crazy thing about it was that all we had done was remove the silica and send the other stuff in. They were pretty unbelievable numbers. After we had come at this in every way we knew how, to disprove it, I decided all we had to do was throw money at this problem, because money solves everything, right?

So, at 69 seconds, I stopped the burn. I let the machine cool down and I took a pocket knife and dug that little bead out of the top of the electrode. When you shut off the arc, it absorbs down into the carbon and you have to dig down into the carbon to get out this little bead of metal.

So I sent this little bead of metal over to Harwell Laboratories in London. They made a precious metals analysis of this bead. I got the report back: "No precious element detected." Now this was one second before the palladium was supposed to start leaving. Yet, according to neutron activation which analysed the nucleus itself, there were no precious elements detected. This made absolutely no sense at all. There had to be an explanation here. Either this material had been converted to another element or it was in a form that we didn't understand yet. So I decided I just had to get more information on it.

I went to a Ph.D. analytical chemist, John Sickafoose, a man who was trained in separating and purifying individual elements out of unknown material. He was trained at Iowa State University and had a Ph.D. in metal separation systems. He's the man that Motorola and Sperry used in the state of Arizona to handle their waste-water problems. He has worked with every element on the periodic table, with the exception of four. He has worked with all the rare earths, he has worked with all the man-made elements. He has physically separated everything on the periodic table with the exception of four elements. Coincidentally, I came to him to have him separate six elements; four of those were the elements he had never worked on.

He said, "You know, Mr Hudson, I have heard this story before. All my life—and I'm a native Arizonan, too—I have heard this story about these precious elements. I am very impressed with the way you have gone about this, with the systematic way you have approached it. I cannot accept any money because if I accept money from you I have to write you a written report. All I have to sell is my reputation. All I have to sell is my credibility. I'm a certified expert witness in the state of Arizona in metallurgical separation systems." He said, "Dave, I will work

for you at no charge until I can show you where you are wrong. When I can tell you where you are wrong, I'll give you a written report. Then you will pay me US\$60 an hour for the time I spent." This would have come to about US\$12,000 to US\$15,000 dollars. If this got rid of the curse, if this just got the thing answered once and for all, it would be worth it. It was for me at the time. Do it, get on with it.

Well, three years later, he said, "I can tell you it is not any of the other elements on the periodic table. We are educated; we are taught to do the chemical separation of the material and then send it for instrumental confirmation."

The example I use is rhodium because it has a unique colour in the chloride solution. It is a cranberry colour, almost like the colour of grape juice. There is no other element that produces the same colour in chloride solution. When my rhodium was separated from all the other elements, it produced that colour of chloride. The last procedure you do to separate the material out is to neutralise the acid solution, and it precipitates out of solution as a red-brown dioxide. It is heated under a controlled atmosphere to 800 degrees for an hour, and that creates the anhydrous dioxide. Then you hydro-reduce that under a controlled atmosphere to get the element, and then you anneal away the excess hydrogen.

So, we neutralised the acid solution and precipitated it out as a red-brown dioxide, which is the colour it is supposed to precipitate. Then we filtered that out. We heated it under oxygen for an hour in a tube furnace, then we hydro-reduced it to this grey-white powder—exactly the colour rhodium should be as an element. Then we heated it up to 1,400 degrees under argon to anneal away the material, and it turned snow-white. Now this wasn't expected. This just isn't what is supposed to happen.

What John did was, he said, "Dave, I'm going to heat it to the anhydrous dioxide. I'm going to cool it down. I'm going to take one third of the sample and put it into a sealed vial. I'm going to put the rest of the sample back into the tube furnace and heat it up under oxygen, cool it back down, purge it with inert gas, and heat it back up under hydrogen to reduce away the oxides. The hydrogen reacts with oxygen, forming water, and cleans the metal. I'll cool that down to the grey-white powder. I'll take half of that and put it into another sealed vial. I'll take the rest of the powder and put it back into the furnace. I'm going to oxidise it, hydro-reduce it and anneal it to the white powder. Then I will put it into a vial and send all three vials to Pacific Spectrochem over in Los Angeles, one of the best spectroscopic firms in the US."

The first analysis came back: the red-brown dioxide was iron oxide. The next material came back: silica and aluminum; no iron present. Just putting hydrogen on the iron oxide had made the iron quit being iron, and now it had become silica and aluminum. Now, this was a big sample. We'd just made the iron turn into silica and aluminum. The snow-white annealed sample was analysed as calcium and silica. Where had the aluminum gone?

John said, "Dave, my life was so simple before I met you. This makes absolutely no sense at all." He said, "What you are working with is going to cause them to rewrite physics books, rewrite

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chemistry books, and come to a completely new understanding."

John gave me his bill: it was US\$130,000, which I paid. But he said, "Dave, I have separated it physically and I have checked it chemically 50 different ways. You have 4 to 6 ounces per ton of palladium, 12 to 14 ounces per ton of platinum, 150 ounces per ton of osmium, 250 ounces per ton of ruthenium, 600 ounces per ton of iridium, and 800 ounces per ton of osmium." These were almost the exact same numbers that the spectroscopist had told me were there. It was such an incredible number that John said, "Dave, I've got to go to the natural place where this stuff comes from and I've got to take my own samples."

So he went up and actually walked the property and took his own samples, put them in a bag, brought them back to the laboratory, pulverised the entire sample and then started doing the analysis on what is called the master blend sample which represents the whole geology—and he got the same numbers.

We worked on this from 1983 until 1989—one Ph.D. chemist, three master chemists, two technicians working full-time. Using the Soviet Academy of Sciences' and the US Bureau of Standards' weights and measures information as a starting point, we literally learned how to do qualitative and quantitative separations of all of these elements. We learned how to take commercial standards and make them disappear. We learned how to buy rhodium trichloride, as the metal, from Johnson, Matthey & Engelhardt and we learned how to break all the metal-metal bonding until it was literally a red solution but no rhodium was detectable. And it was nothing but pure rhodium from Johnson, Matthey & Engelhardt. We learned how to do it with iridium, we learned how to do it with gold, we learned how to do it with osmium, we learned how to do it with ruthenium. This is what we found when we actually purchased a machine for high-pressure liquid chromatography.

For your information, this person named John Sickafoose was the man who actually wrote his Ph.D. thesis at Iowa State University on how to build this instrument. He conceptualised building this instrument back in 1963-64. After he graduated, some of the graduate students there took that technology and developed it, and eventually Dow Chemical came in and bought it. Dow went ahead and commercialised it and now it is the most sophisticated chemical separation instrument that the world has. It's computer-controlled, all high-pressure, and you can do very precise separations with it. Because this is the man who conceptualised and designed it and told them what the limitations would eventually be on it, he was the ideal man to take the technology and perfect it.

So we were able to use their basic technology and develop a separation system for the rhodium trichloride. We actually separated five different species in the commercial rhodium trichloride. What this is all about is that the word "metal" is like the word "army". You can't have a one-man army. The word "metal" refers to a conglomerate material. It has certain properties: electrical conductivity, heat conduction, and all these other aspects. When you dissolve the metals in acid, you get a solution that is clear without solids. You assume it's a free-ion solution, but when you are dealing with noble elements they're still not free ions. It's what is called "cluster chemistry".

Since the 1950s there has been a whole area of research in col-

leges on cluster chemistry and catalytic materials. But what happens is the metal-metal bonds are still retained by the material. So, if you buy rhodium trichloride from Johnson, Matthey & Engelhardt, you are actually getting $Rh_{12}Cl_{36}$ or $Rh_{15}Cl_{45}$. You really aren't getting $RhCl_3$. There is a difference between the metal-metal bonding material and the free ions. What you are buying is cluster chemistry; you are not getting free ions. When you put the material in for the instrumentation to analyse, it is actually the metal-metal bonds of the cluster that are analysed. The instrumentation is not really analysing the free ions.

I heard that General Electric was building fuel cells using rhodium and iridium. So I made contacts with their fuel-cell people back in Massachusetts and travelled there to meet with them. They had three attorneys meet with us, and the GE people were there. The attorneys were there to protect the GE people because a lot of people say they have technologies and they meet with them; then after the meeting they sue them, claiming that GE stole their technology. Then, to defend themselves, GE has to divulge what their technology really is. So GE is very sceptical when you say that you have something new. They bring in their high-faluting attorneys to really screen you.

After about an hour they said, "These guys are for real. You attorneys can leave." That was because they had also had the explosions. They knew that when they buy the commercial rhodium trichloride it analyses very well. But to make it ready to go into their fuel cells they have to do salt effusions on it, where they melt the salt and put the metal in with it to disperse it further. They know that when they do that, the metal doesn't analyse as well any more. So when we told them that we had material that didn't

analyse at all, they could conceive how this was possible. They had never seen it, but they said, "We are interested."

Now these are the people, GE, who build analytical instrumentation. They said, "Dave, why don't you just make a bunch of rhodium for us and send it to us and we'll mount it in our fuel-cell technology. We'll see if it works in a place where only rhodium works. What is the mechanism of conversion of monatomic rhodium to metallic rhodium in these fuel cells?"

No other metal has ever been found which will perform the catalysis in the hydrogen-evolving technology of the fuel cell, other than rhodium and platinum. And rhodium is unique compared to platinum because rhodium does not poison with carbon monoxide and platinum does. They said, "Dave, we'll just run it to see if it's a hydrogen-evolving catalyst and, if it is, then we will see if it is carbon monoxide-stable and, if it is, then it's rhodium or it's a rhodium alternative."

So we worked for about six months and refined that amount of material and we re-refined it and re-refined it. We wanted to be absolutely sure that this was really clean stuff. We didn't want any problems with this. We sent it back to Tony LaConti at GE.

GE, by that time, had sold their fuel-cell technology to United Technologies who already had a fuel-cell technology. All the GE fuel-cell people had to go work for United Technologies, and, since United Technologies already had their in-house people, the GE people were not integrated into the existing teams. So all the GE people were junior people; they weren't senior any more.

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After a certain period of months they all quit and left United Technologies. Well, José Giner, who was the head of fuel cells at United Technologies, quit also and went to set up his own firm, called Giner Incorporated, in Waltham, Massachusetts. Tony and all the GE people went with him.

By the time our material got there, they'd set up their own company in Waltham, so we contracted with them to build the fuel cells for us.

When our material was sent to them, the rhodium, as received, was analysed as not having any rhodium in it. Yet when they mounted it on carbon in their fuel-cell technology and ran the fuel cell for several weeks, it worked and it did what only rhodium would do—and it was carbon monoxide-stable.

After three weeks, they shut down the fuel cells, took out the electrodes and sent them back to the same place that said there was no rhodium in the original sample. Now there was over eight per cent rhodium in the original sample. What happened was, it had begun to nucleate on the carbon. It actually had begun to grow metal-metal

bonds! So now there was metallic rhodium showing on the carbon, where before there was no rhodium.

These GE people said, "Dave, if you are the first one to discover this, if you are the first one to explain how to make it in this form, if you are the first one to tell the world that it exists, then you can get a patent on this." I said, "I'm not interested in patenting this."

Then they told me that if someone else discovered it and patented it, even though I was using it every day, they could stop me from doing it. I said, "Well, maybe I should patent it."

So, in March of 1988, we filed US and worldwide patents on Orbitally Rearranged Monatomic Elements. Now that is a mouthful, so, to make it short, we called it ORMEs. You have ORME gold, ORME palladium, ORME iridium, ORME ruthenium, ORME osmium, or ORMEs.

When we were doing this patent procedure, the Patent Office said, "Dave, we need more precise data, we need more exact data, we need more information about this conversion to this white powder state." One of the problems we had was that when you make this white powder and

you bring it out into the atmosphere, it really starts gaining weight. I'm not talking about a little bit of weight; I'm talking about 20 to 30 per cent. Now that normally would be called absorption of atmospheric gases: the air is reacting with it and causing weight gain, but not 20 or 30 per cent.

But, nonetheless, we had to answer the Patent Office. We had to come up with exact data for the Patent Office.

So what we did was use this machine for thermogravimetric analysis. This is a machine that has total atmospheric control of the sample. You can oxidise it, hydro-reduce it and anneal it while continually weighing the sample under a controlled atmosphere. Everything is all sealed. We were getting short on funding and couldn't afford to buy one, so we leased one from the Bay Area from Varian Corporation. They sent it in to us and we set it up on computer controls.

We heated the material at 1.2 degrees per minute and cooled it at 2 degrees per minute. What we found was that when you oxidise the material, it weighs 102 per cent; when you hydro-reduce it, it weighs 103 per cent. So far, so good. No problem. But, when it turns snow-white, it weighs 56

per cent! Now that's impossible! When you anneal it and it turns white, it only weighs 56 per cent of the beginning weight! If you put that on a silica test boat and you weigh it, it weighs 56 per cent! If you heat it to the point that it fuses into the glass, it turns black and all the weight returns.

So the material hadn't volatilised away. It was still there. It just couldn't be weighed any more. That's when everybody said, "This just isn't right; it can't be!"

Do you know that when we heated it and cooled it, and heated it and cooled it, and heated it and cooled it under helium or argon, when we cooled it, it would weigh 300 to 400 per cent of its beginning weight; and, when we heated it, it would actually weigh less than nothing? If it wasn't in the pan, the pan would weigh more than the pan weighs when this stuff is in it!

Keep in mind, these are highly trained people running this instrumentation, and they would come in and say, "Take a look at this. This makes no sense at all!"

Now, this machine is so precisely designed and controlled that they have a magnetic material they can put into this machine that is non-magnetic when it goes

into the machine but at 300 degrees it becomes magnetic. It is in fact a strong magnet. Then, after you get up to 900 degrees, it loses its magnetism. You can actually see if the interaction of the magnetism with the magnetic field of the heating element causes any change in weight.

The heating element is bifilar-wound. It goes round and round the sample; then you reverse it and wind it right back up so all the current runs against itself all the time. So, when a wire flows electricity there is a magnetic field that forms around it, but when you run the wire right next to it, going in the other direction, it forms a magnetic field in the other direction. The idea is that the two fields will cancel. This is the kind of wiring that is used in a television to cancel all magnetic fields. The designers of this machine wanted to eliminate all magnetic field aspects to this.

When we put the magnetic material in the sample and ran it in the machine, there was no response at all. There was no change in weight when the material became magnetic or lost its magnetism. Yet when our material was put in there and it turned white, it went to 56 per cent of its beginning weight. If you shut off the

machine and let it cool, it was exactly 56 per cent. If you heated it, it would go less than nothing, and if you cooled it, it would go 300 to 400 per cent, but it always went back to a steady 56 per cent.

We contacted Varian in the Bay Area and said, "Look, this just doesn't make any sense. There's something wrong with this machine; something isn't right. Every time we use the machine it works fine unless we make the pure monatomic material, and, when we do, it turns snow-white and doesn't work correctly any more."

Varian looked over our results and said, "You know, Mr Hudson, if you were working with the cooling of the material we would say it is superconducting. But inasmuch as you are heating the material, we don't know what you've got."

I decided, well, I have had to learn chemistry and I've had to learn physics, and now I've got to learn the physics of superconductors. So I borrowed a bunch of graduate books on superconductivity and I began to read about superconductors.

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